

ABSTRACT

A method and apparatus for control of optical trap arrays and formation of particle arrays using light that is in the visible portion of the spectrum. The method and apparatus provides a laser and a time variable diffractive optical element to allow dynamic control of optical trap arrays and consequent control of particle arrays and also the ability to manipulate singular objects using a plurality of optical traps. By avoiding wavelengths associated with strong absorption in the underlying material, creating optical traps with a continuous-wave laser, optimizing the efficiency of individual traps, and trapping extended samples at multiple points, the rate of deleterious nonlinear optical processes can be minimized.